AMENDMENTS TO THE SPECIFICATION

In the Substitute Specification filed May 15, 2008, please replace the "Detailed Description" section from page 5 to page 11 with the following section:

Detailed Description:

Work medium is brought into the first stage chamber 1 during the first stage chamber volume increasing, as in Figure 1, whereby it is, during the first stage chamber 1 volume decreasing, it is transferred into the stage chamber 2, simultaneously with its volume increasing. It is then, during the second stage chamber 2 volume decreasing, transferred into the third stage chamber 3. While transferring through the third stage chamber 3, heat is supplied into work medium either from inside by fuel combustion, or from outside by the third stage chamber heating e.g. by exterior combustion. Work medium is transferred from the third stage chamber 3 into the fourth stage chamber 4, whose volume simultaneously increases, whereon it is, from the fourth stage chamber 4, concurrently with its volume decreasing, transferred into the fifth stage chamber 5. In this fifth stage chamber 5, the work medium is allowed to expand within its volume increasing. Work medium is after its expansion, concurrently with the fifth stage chamber 5 volume decreasing, either conducted outside, or inside back into the first stage chamber 1. When using air as a work medium and exterior combustion as a concept of the heat supply into the third stage chamber, it is convenient to use expanded, but hot, air for the ~~inside~~ outside combustion. The present invention therefore presents five-cycle thermo dynamical cycle. These can be convenient, in some cases, to avoid the fourth stage chamber 4 and to transfer work medium into the fifth stage chamber and allow it to expand in this stage chamber. It is convenient, when work medium is cooled inside the interstage cooler 6, during its transfer from the stage chamber 1 into the second stage chamber 2 (see Picture 2). In the closed cycle, where the work medium is transferred from the fifth stage chamber 5 back into the first stage chamber 1, it is convenient to insert other interstage cooler 7 between the fifth and the first stage chamber. It is also convenient, in some cases, according to the other invention concept, to join the fifth and the first stage chamber into the joined stage

chamber 51 and to transfer (during this joined stage chamber volume re-decreasing) work medium, expanded during the joined stage chamber 51 volume increasing, into the second stage chamber 2, simultaneously with this second stage chamber increasing, optionally through the joined interstage cooler 76. The basic five-stroke cycle is, in this case, adapted into the three-stoke cycles.

The apparatus, as described above, performing the conversion of heat energy into mechanical energy is according to the invention, arranged in a way, so that the third stage chamber 3 composes from, at least, one workspace with an invariable volume, while the other stage chambers 1, 2, 4, 5, 51 are created as workspaces with the variable volumes. It is convenient to create all the stage chambers, excluding the third one, as piston machines with the revolving piston. Where the cusps edges join together during the piston revolution above each plane, the space volume may be enclosed by this area and the inclined inside cylinder plane, where the piston revolves in, decreases. Here, the largest volume of the first stage chamber 1 is larger than the largest volume of the second stage chamber 2, and furthermore, the largest volume of the fifth stage chamber 5 is larger than the largest volume of the fourth stage chamber 4 and the largest volume of the stage chamber 5 is larger than the largest volume of the stage chamber 1. The largest volume of the joined stage chamber 51 is larger than the largest volume of the stage chamber 4 and also larger than the largest volume of the stage chamber 2. The third stage chamber 3 is created as a combustion chamber and/or as a heat exchanger. Work medium is firstly supplied (e.g. by sucking) into the increasing volume of the first stage chamber 1. After reaching maximum, the volume of this stage chamber begins to decrease and work medium is exhausted into the increasing volume of the second stage chamber 2. Because the largest volume of the second stage chamber is many times smaller than the largest volume of the first stage chamber 1, the state of work medium changes so that, after its shift from the first stage chamber 1 into the second stage chamber 2, this medium has higher pressure and also higher temperature. If the temperature increase is not desirable, it is possible to insert the interstage cooler 6 between both of the stage chambers according to the Figure 2. When the volume again decreases in the second stage chamber 2, work medium is transferred from it through the third stage chamber 3 into the fourth stage chamber 4, while increasing its volume. Heat is supplied into work medium in the third stage

chamber 3 either by ~~inside combustion~~ outside warming, where the stage chamber is made as a heat exchanger, or by inside combustion in a way of the combustion in the turbine's combustion chambers, but under considerably higher pressure. Because the largest volume of the fourth stage chamber 4 is generally equal to the largest volume of the second stage chamber 2, work medium has in the fourth stage chamber 4, after warming in the third stage chamber, in the final state, higher pressure and also higher temperature contrary to the initial state in the second stage chamber 2. Work medium expands from decreasing volume of the fourth stage chamber 4 into increasing volume of the fifth stage chamber 5, where it performs work. It is also possible to adapt this apparatus according to the present invention, so that the largest volume of the fourth stage chamber 4 is larger than the largest volume of the second stage chamber 2, so that the partial isobaric to isothermal expansion between both of the stage chambers will occur and this adaptation will reach Carnot's cycle concept. In an extreme case, it is possible to completely avoid the fourth stage chamber and to let work medium expand from the second stage chamber 2, during warming in the third stage chamber 3, into the fifth stage chamber 5. The third stage chamber has a nonzero volume so that, if there is no heat supplied, the partial expansion occurs at the beginning of the work medium transfer and after transferring through the third stage chamber into the fourth stage chamber, work medium has lower pressure and also lower temperature then in the second stage chamber. However, due to this lower pressure, the fourth stage chamber takes proportionally lower weighted quantity of work medium than it is supplied into the third stage chamber from the second stage chamber and the residual quantity generates, or optionally increases, the residual pressure in the third stage chamber. According to the size of the third stage chamber, in this manner also without heat supply, the pressure in the third stage chamber very quickly rises, so that expansion, within the work medium transfer from the second stage chamber into the third stage chamber, does not occur and it is possible to supply heat under the pressure given by compressed work medium from the first stage chamber into the second stage chamber. It is therefore possible to dimension the third stage chamber both as a combustion chamber with a small external area, so that needles heat leak does not occur, and as a heat exchanger with a large area, so that it is possible to supply the largest heat quantity possible. In order to supply the largest possible heat quantity into the third stage chamber and to decrease the work expended during the compressional stage chamber of the cycle, it is, if possible, needed to

decrease temperature during the transfer from the first stage chamber into the second one. It is, according to the present invention, enabled by inserting the interstage cooler 6 between the first stage chamber 1 and the second stage chamber 2. At the enclosed cycle, where work medium is transferred from the fifth stage chamber 5 back into the first stage chamber 1, it is appropriate to insert an innerstage cooler 7 between these two stage chambers. At the configuration according to the invention, it is possible to choose, independently upon the compression ratio, magnitude of the expansion ratio, so that it is possible to expand compressed to the pressure of the surrounding environment and heated work medium, whereby a good cycle efficiency is reached. At the given expansion ratio, the pressure at the end of the expansion is given by magnitude of the pressure at its beginning and this pressure, at the end of the expansion, can therefore, at the smaller heat supply, drop under the surrounding environment pressure. If this phenomenon is not desirable, it is possible to incorporate other inventive aspects i.e. additional work medium inlet through the inlet valve 8 at the end of the expansion. The power cycle, realized according to the present invention and apparatus, is therefore five-stroke cycles. At certain expansion ratio magnitude in the fifth stage chamber 5 (i.e. the ratio between the largest volumes of the fifth and fourth stage chambers), not only the pressure at the end of the expansion, but also the temperature drops to the value of the surrounding environment. It is therefore possible at the enclosed cycle and at the outside work medium warming, which take place in the third stage chamber 3, according to the other invention character, to join the fifth stage chamber 5 with the first stage chamber 1 according to Figure 3 and to transfer work medium after expansion in the convenient way from the joined stage chamber 51 through the interstage cooler 76 into the second stage chamber 2 concurrently with its compression. In this case, it is also desirable to equip the joined stage chamber 51 by the inlet valve 8. It is therefore possible, in some cases, within the invention, to adapt the five-stroke cycle to the three-stroke cycle.

The present invention is, both according to the design examples mentioned previously and in comparison to the other known heat engines, more convenient especially by its possibility to allow higher working pressure and temperature then turbine engines, longer warming of the compressed work medium and lower pressure and temperature at the end of the expansion then so far know piston engines. Higher cycle efficiency, lower emissions of the carbon and

nitrogen oxides, lower noise in the case of work medium warming by external or internal combustion is the outcome of the present invention. It is also possible to use the present invention for the conversion of solar energy into mechanical energy.